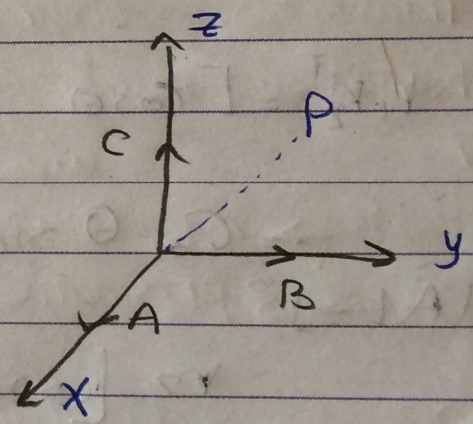
DATE: Lec SUBJECT:

orthogonal Matrix

1. $|A| = \pm 1$
2. $r_i r_j^T = 0$ الأعمدة والصفوف متعامدة
3. $A^{-1} = A^T$

$$A^{-1} = \frac{1}{1}\begin{bmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{bmatrix} = A^T$$

* orthogonal transformation



$$P_{(xyz)} = R P_{ABC}$$
$$P_{ABC} = R^{-1} P_{xyz}$$

$$R_{(x,\theta)} = \begin{bmatrix} 1 & 0 & 0 \\ 0 & \cos & -\sin\theta \\ 0 & \sin & \cos\theta \end{bmatrix}$$

$$R^{-1}_{(x,\theta)} = R^T_{(x,\theta)} = \begin{bmatrix} 1 & 0 & 0 \\ 0 & \cos\theta & \sin\theta \\ 0 & -\sin\theta & \cos\theta \end{bmatrix}$$

inverse ≅ Transpose

بيعكس الإشارة sine فقط

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slide.

ex: 3.6 . 45 Composed. مركب

$$*RR^{-1} = RR^{T} = R^{-1}R = R^{T}R = I$$

$$A.I = I.A = A$$

xyz ← I → ABC

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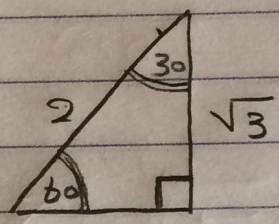

*base reference Fram ⟹ xyz

الدوران بزاوية $\theta = 0$ أي كأنك مش عملت حاجة ≅ انه ضربتي I

end. 5.50

5.55

B1, A1 OZ ϕ

O A θ B2, C1

O C ψ B2 B3